

INTISARI

Pemasangan implan memiliki resiko kegagalan implan. Pencegahan kegagalan implan dapat dilakukan modifikasi permukaan implan dengan *coating* menggunakan bahan magnesium hidroksida. Magnesium hidroksida memiliki biokompatibilitas baik mendukung osseointegrasi antara permukaan implan gigi dan tulang rahang dengan melibatkan sel osteoblas dalam pembentukan sel baru. Penelitian ini bertujuan untuk mengetahui pengaruh konsentrasi magnesium hidroksida sebagai bahan *coating* implan gigi terhadap viabilitas sel osteoblas.

Penelitian eksperimental dilakukan menggunakan serbuk magnesium hidroksida (*US Research Nanomaterials, Inc., USA*) dalam bentuk suspensi konsentrasi magnesium hidroksida 0,1 mg/mL; 0,25 mg/mL; dan 0,5 mg/mL. Kultur sel osteoblas menggunakan *osteoblast cell line* MC3T3-E1 dengan konfluen 80%. Pemaparan suspensi magnesium hidroksida dengan sel osteoblas dilakukan selama 24 jam dan suhu 37°C pada *96-well microplate flat bottom* kemudian dilakukan uji sitotoksitas CCK-8. Data hasil penelitian dianalisis dengan uji normalitas *Shapiro-Wilk*, uji homogenitas *Levene's test*, uji *one-way ANOVA*, dan uji *post hoc LSD*.

Hasil penelitian menunjukkan rerata persentase viabilitas sel osteoblas setelah perlakuan dengan konsentrasi magnesium hidroksida yaitu 0,1 mg/mL (92,28%); 0,25 mg/mL (86,64%); dan 0,5 mg/mL (80,85%). Persentase viabilitas sel osteoblas hasil penelitian di atas 70% bersifat tidak toksik. Hasil analisis *one-way ANOVA* menunjukkan $F = 4,16$ dengan $p < 0,05$ bahwa terdapat perbedaan viabilitas sel osteoblas yang signifikan akibat pengaruh konsentrasi magnesium hidroksida. Hasil uji *post hoc LSD* terdapat perbedaan bermakna pada kelompok konsentrasi magnesium hidroksida 0,1 mg/mL dan 0,5 mg/mL. Kesimpulan penelitian yaitu konsentrasi magnesium hidroksida sebagai bahan *coating* implan gigi berpengaruh terhadap viabilitas sel osteoblas.

Kata kunci: magnesium hidroksida, sel osteoblas, uji CCK-8, *coating* implan gigi

ABSTRACT

Implant placement carries the risk of implant failure. Prevention of implant failure can be achieved by modifying the implant surface with a coating using magnesium hydroxide. Magnesium hydroxide has good biocompatibility, supporting osseointegration between the dental implant surface and the jawbone by involving osteoblast cells in the formation of new cells. This study aims to determine the effect of magnesium hydroxide concentration as a dental implant coating material on the viability of osteoblast cells.

The experimental research was conducted using magnesium hydroxide powder (US Research Nanomaterials, Inc., USA) in the form of a suspension with magnesium hydroxide concentrations of 0.1 mg/mL; 0.25 mg/mL; and 0.5 mg/mL. Osteoblast cell cultures used the MC3T3-E1 osteoblast cell line with 80% confluence. The exposure of the magnesium hydroxide suspension to the osteoblast cells was carried out for 24 hours at 37°C on a 96-well flat-bottom microplate, followed by a CCK-8 cytotoxicity test. The research data analyzed using the Shapiro-Wilk normality test, Levene's test for homogeneity, one-way ANOVA, and post hoc LSD test.

The research results showed the average percentage of osteoblast cell viability after treatment with magnesium hydroxide concentrations of 0.1 mg/mL (92.28%); 0.25 mg/mL (86.64%); and 0.5 mg/mL (80.85%). The percentage of osteoblast cell viability in the study results above 70% is considered non-toxic. The results of the one-way ANOVA analysis showed $F= 4.16$ with $p<0.05$, indicating a significant difference in osteoblast cell viability due to the influence of magnesium hydroxide concentration. The results of the post hoc LSD test showed a significant difference in the groups with magnesium hydroxide concentrations of 0.1 mg/mL and 0.5 mg/mL. The conclusion of the study is that the concentration of magnesium hydroxide as a dental implant coating material affects the viability of osteoblast cells.

Keywords: magnesium hydroxide, osteoblast cell, CCK-8 assay, dental implant coating